

³⁵S AMINO ACIDS AND THE RELEASE OF VOLATILE COMPOUNDS

³⁵S labeled amino acids release volatile radioactive compounds. The volatile components are very soluble in water; thus the water present in incubators used for cell culture can become contaminated.

According to a letter published in Nature Vol. 335, 8 September 1988, the authors stated that a total of 300,000 c.p.m. (measured by liquid scintillation counting) were found in 500 ml water consequent to the use of 2.5 mCi ³⁵S methionine in a single, 6-h incubation. An excerpt discussing the main problem is stated below:

Because this water is continually evaporating; incubators; trays, side walls, door and even the outside of other dishes of cells, may become contaminated. The rubber gasket sealing the door and the metal fan that recirculates the air inside the incubators were found to be so highly contaminated that the contamination was readily detectable by a hand held G-M monitor. Filters used to wipe 10 cm² areas inside the incubator picked up several thousand c.p.m.

Some recommendations:

1. Thaw ³⁵S-amino acid vials in a fume hood using a needle through the rubber septum to vent the vial (or better, a syringe packed with charcoal attached to the needle).
2. Lower the humidity in the incubator as low as the experiment can tolerate. This will help prevent water condensation on the inside walls and glass door.
3. Place a small pan of activated charcoal on the top shelf of the incubator to help decrease the contamination in the air. Frequent monitoring of incubator surfaces should indicate when the charcoal is no longer effective and requires changing. Dispose of charcoal as radioactive waste.
4. Place charcoal paper (can be ordered through F & J Specialty Products, Inc.) as close as possible on top of the experiment. Change the charcoal paper at least once a week. The humidity in the incubator reduces the effectiveness of charcoal the longer it sits in the incubator. Dispose of charcoal paper as radioactive waste.
5. Change the incubator water as necessary and dispose as radioactive waste.
6. Use stabilizing agents (tricine-stabilized methionine generates approximately 70% less volatile impurities).